

Dartex

DARTEX

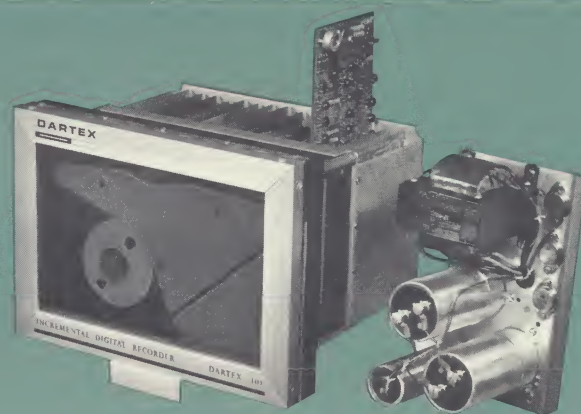
ELECTRO-MECHANICAL AND ELECTRONIC DATA SYSTEMS

DARTEX-101 DIGITAL MAGNETIC TAPE DATA SYSTEMS are extremely versatile and economical buffered links between high-speed computers and data source devices. Appropriately interfaced, they provide significant savings in computer time since they can match the capacity and data rates of slow, intermittent or incremental off-line input/output devices then effect medium speed on-line computer entry. Data can be more frequently processed by the use of $\frac{1}{4}$ " wide computer-grade tape on 3" reels that will accept all data possible to manually enter in one day. No waiting to fill large reels or forwarding of bulky, expensive reels only partially prepared. The self-contained systems include a precision tape transport,

a data controller and a power supply. Computer-type construction of the tape transport features precision mechanisms on a temperature stabilized casting with the most advanced tape drive technique, the single capstan drive, for gentle tape handling and precise control of tape motion. Automatic loading eliminates the need to wrap tape around a take-up reel. The electronic circuitry is all silicon, solid-state with integrated micro-circuits on plug-in, glass-epoxy printed circuit boards. Recording density is 30 8-bit characters per inch for a storage capacity of more than 100,000 alpha-numeric characters. Data input or output is 8 channel at asynchronous rates to 75 characters per second or synchronous to 1200 ch/seconds.

BASIC DARTEX-101 INCREMENTAL RECORDER FOR INCORPORATION INTO DATA LOGGING SYSTEMS

The BASIC DARTEX-101 is the ideal system component for unattended and economical storage of random input data. It is a complete incremental recorder for reading and writing at rates to 75 characters per second, fully operable from remote logic level commands. It can be interfaced to match input devices such as digital voltmeters, digital frequency meters and keyboard inputs. It can also be interfaced to Dataphone for unattended transmission to a computer center on command, or reels can be sent to the computer for high-speed entry from an on-line 101 shown below. Local printout of logged data can be accomplished on a slow speed printer or typewriter. Space and mounting requirements are minimum for this added system capability.

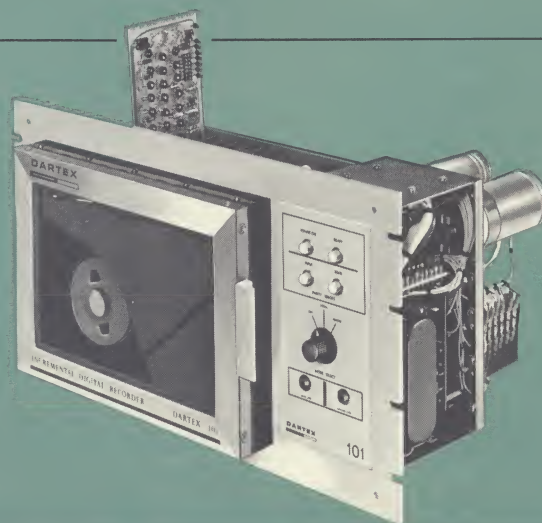


DESK-TOP DARTEX-101A WITH DATAPHONE COMPATIBILITY

For economical remote data collection or off-line computer input, this system reads or writes 8-bit characters at any random rate to 75 characters per second. It can be interfaced to various slow speed data input/output devices such as keyboards and typewriters. For remote data collection, plug-in compatibility with a Dataphone can be provided to permit collection of input data which can then be automatically transmitted at optimum phone line rates on command from a computer center. Conversely, the 101-A can receive data via Dataphone and then drive slow speed printout devices. For off-line computer inputs, tape reels can be transferred to an on-line 101-B for high speed computer entry.

RACK MOUNT DARTEX 101-B FOR ON-LINE COMPUTER CENTER INSTALLATION

The DARTEX-101B provides high-speed reading and high-speed writing at rates to 1200 characters per second on tapes that are interchangeable with other DARTEX 101 off-line or remote systems operating incrementally. Interface can be provided for plug-in compatibility with computer input/output channels to offer several advantages. For example, a 101-B has the input capability of a high-speed photoelectric paper tape reader with the added capability of providing computer output at the same rate. Increased efficiency of processing results from the DARTEX 3" reel size. Data logged at a day-to-day pace can be processed on a regularly scheduled daily basis with a minimum of handling.



15 December 1965

Mr. T.H. Nelson, Sys. Engr.
Interlocking Systems Company
Box 1546
Poughkeepsie, New York 12603

Dear Mr. Nelson:

Thank you for your inquiry. Enclosed is more detailed information on the DARTEX DIGITAL MAGNETIC TAPE systems.

The basic DARTEX-101 is priced at \$1,990. We would be glad to consider your particular application requirements in more detail, and quote on a specific configuration that will meet your need.

Very truly yours,



Robert A. Kleist
General Manager.

RAK:ba
Encl.

**A flexible array
of capabilities
coupled with
reliability and
simplicity
of operation...
at low cost.**

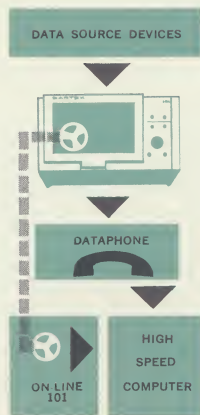
DIGITAL

MAGNETIC TAPE

DATA SYSTEMS

DARTEX

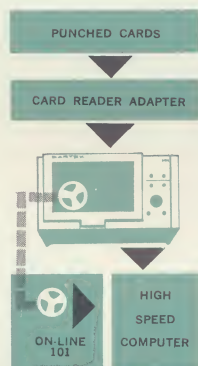




Remote Data Collection — Dataphone Compatibility

This is the ideal link between the computer and such source devices as keypunches, data logging transducers and curve followers which are located at remote stations. For example, a DARTEX-101 Incremental Digital Recorder can accept data at intermittent rates and output those data at a speed to match the communication channel. An optional incremental back-space mode makes possible correction of errors in data tape entries. Data collected on a DARTEX-101 are transmitted by DATAPHONE or the individual reels are sent to the computer center and there read at continuous high speed into the computer from a DARTEX-101 modified to operate at higher synchronous rates. Where DATAPHONE is used, provisions are made for unattended operation at the remote station by transmission of data on command from the computer center.

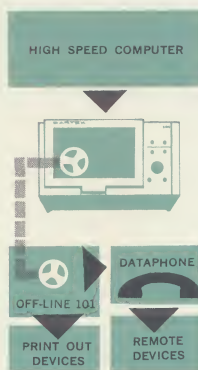
Dartex Data System Capabilities....



High-Speed Computer Program Entry Of Off-Line Inputs

DARTEX Digital Magnetic Tape Data Systems provide significant savings in high-speed computer time by their capability to prepare data off-line on a magnetic tape medium. For example, a program prepared on punched cards may be entered on magnetic tape through the use of a DARTEX-101 Incremental Recorder with card reader adapter. Program data can also be entered directly onto magnetic tape from a typewriter in such an off-line system.

Computer entry is accomplished from a DARTEX-101 modified to operate at higher synchronous rates on-line with the computer. Data are entered from tapes prepared off-line from one or more DARTEX-101 Incremental Recorder systems.



Off-Line And Remote Computer Print-Out And Displays

For data storage and subsequent print-out and display functions, the flexible and low cost DARTEX Digital Magnetic Tape Systems quickly pay for themselves in computer time saving. Computer output is accepted by a DARTEX-101 modified to operate at higher synchronous rates. An off-line DARTEX-101 can then retransmit those data at low speed or incrementally to such print-out devices as an electric typewriter, paper tape perforator, card punch, or graphic display plotter. Data can also be transmitted by DATAPHONE to a remotely located DARTEX-101 which can then drive print-out and display devices. It can also be used as a programmed control source for applications such as numerical control systems.

Medium-Speed And Low-Speed Computer Input-Output

Cost has heretofore been the major barrier to providing medium-speed and low-speed computers with the manifest advantages of magnetic tape input-output capability. The DARTEX-100 transport, compatible with any computer in this class through available DARTEX interface electronics, solves this problem at a fraction of the cost of present tape units.

DARTEX

Dartex Data System Equipment Description....

Dartex-100 Digital Magnetic Tape Transport

The DARTEX-100 is a miniature precision digital transport for use with computers and data acquisition systems where data rates and capacity do not justify the cost of high speed, large capacity digital transports. The DARTEX-100 cost is scaled down according to comparatively lower data rate and data capacity. It features gentle tape handling, precise control of tape motion, and a design which meets the need for reliable, easily maintained data system equipment.

The most advanced tape drive technique, the single capstan drive, is used in the DARTEX-100. Most conventional tape transports use constantly rotating capstans with a roller that rapidly forces the tape against the capstan for fast starts. Similarly, the roller is disengaged and friction in the tape path is used to bring the tape to a sliding stop. This causes wear on both the mechanism and tape during these start/stop transients. Also, the constantly rotating capstan has to run at one selected speed, so that speed changes cannot be readily obtained by remote command. In contrast, the DARTEX-100 tape drive is a single capstan to which the tape is constantly engaged. The tape motion over the head follows this capstan motion at all times. The capstan is servo-driven so that it will, on command from input signals, gently accelerate tape to and maintain it at the desired running velocity or gently decelerate the tape from running velocity to stop. These input signals can command the capstan to provide bi-directional, incremental, rewind, or high speed search operation. At all times, the tape is maintained in non-sliding contact with the capstan in a low friction tape path, and peak acceleration of the tape is limited to a conservative level.

The basic transport includes tape drive electronics and read/write heads together with write drivers and read circuitry that operate with digital inputs and outputs. In addition to power inputs, the transport interface consists solely of digital signals for all control and data inputs and outputs. The DARTEX-100 can mount into a console, a rack panel, or an enclosure for setting on a desk top.

Recording and reading techniques are those that have a history of reliable performance in high speed computer transports. This includes saturation recording with an NRZI data format that has an odd parity recorded for each data frame, and peak detectors in the read circuitry. In the standard recording format, two tracks are used with data recorded serially-by-bit on a data track and a parity check bit is written on the other track (i.e., complementary coding). Other recording options with up to 4 tracks can be provided.

The beginning-of-tape and end-of-tape options similarly

use the proven computer transport technique of photo-sense from reflective tabs on the tape surface.

Other optional features are available to adapt this versatile transport to individual requirements.

Dartex-101 Incremental Digital Recorder

The DARTEX-101 uses the DARTEX-100 Digital Magnetic Tape Transport with an integrated microcircuit data controller and a power supply to provide a complete incremental recording system. A wide variety of input and output data rates may be accommodated (and synchronized with external control signals) without sacrificing storage density.

This recording system will write or read parallel eight-channel codes (including parity) for asynchronous (incremental) operation at rates up to 75 characters per second. This format and data rate match the DARTEX-101 to the DATAPHONE 402 data sets. Optional interface circuitry provides plug-in compatibility. All codes received to be written or those read back from tape are checked for proper odd parity. The check bit of all incoming codes is automatically corrected, if necessary to provide proper parity before the code is recorded, enabling the use of seven-channel codes without redundancy where desired. This insures that erroneous characters will not be lost either on writing or reading.

Each eight-bit character is recorded serially-by-bit on a single data track and a parallel parity track using the standard recording format of the DARTEX-100 transport.

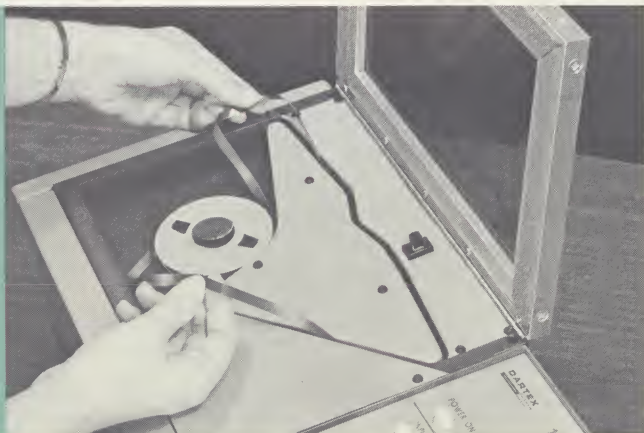
Recording a character is accomplished upon receipt of a write command by linearly bringing the tape up to its recording speed, then recording the 8-bit character serially on the data track, followed by an end-of-character mark which also serves as a "longitudinal" parity check for the character. After the end-of-character mark is written, the tape is linearly decelerated to a stop. A small gap is left between characters to allow for starting and stopping of tape during incremental reading and recording.

Reading is accomplished in a manner similar to recording. Upon receipt of a read command, the tape is linearly accelerated to its reading speed, the character is read serially from tape into a register, and the tape is decelerated to a stop. Immediately upon reading the complete character into the register, parallel output lines are energized for each data bit read from tape, along with an output strobe signal of approximately 50 microseconds duration. If desired, this output strobe signal may be caused to remain "true," along with the parallel data lines, until receipt of an external feedback signal.

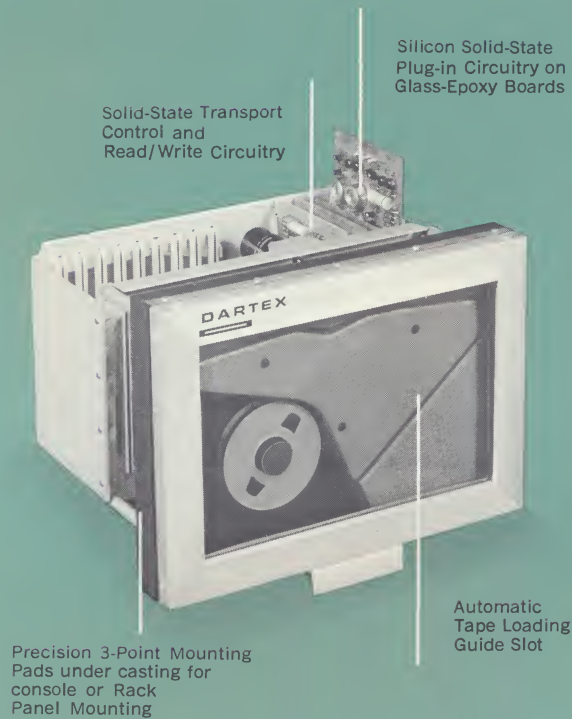
Characters of fewer than eight bits may be recorded by simply grounding the unused inputs.

Simplified Loading Feature Eliminates Threading and Attachment To Take-Up Reel

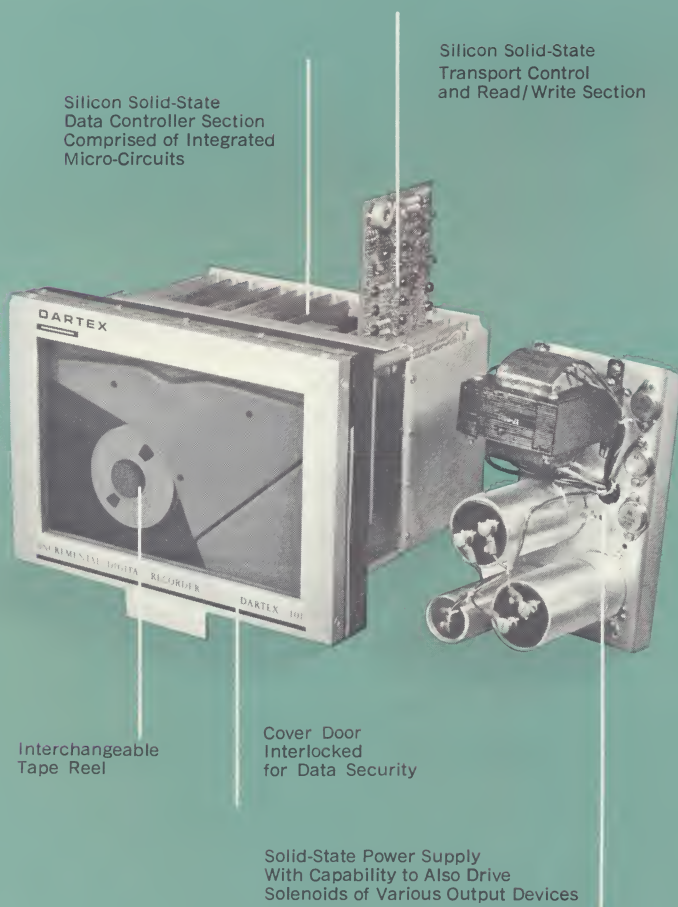
The storage medium for both the Dartex-100 and Dartex-101 is ¼-inch wide computer-grade magnetic tape on 3-inch reels that can be quickly and easily exchanged because of the automatic tape loading feature. To load tape, the reel is installed and a length of tape is simply dropped into a guide slot. There is no need to wrap tape around a take-up reel. It is done automatically, and the transport is ready for operation after the "load" button is depressed. This loading feature combines simplicity of operator function with the high performance that can be obtained with a reel in a precision tape transport.



Dartex-100 Tape Transport



Dartex-101 Incremental Recorder



TRANSPORT CHARACTERISTICS

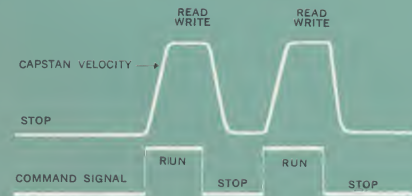


Figure 1 shows the relationship of the servo-driven capstan velocity to run-stop command signals.

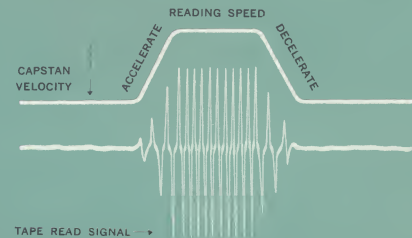


Figure 2 shows the read signals from a tape and a trace of the capstan velocity. The identical proportions indicate that the tape motion over the head precisely follows the capstan tape drive at all times.

INCREMENTAL READ/WRITE OPERATION

DIAGRAM OF RECORDED CHARACTER



This diagram shows a parallel eight-channel code (including parity) followed by an end-of-character mark. The unique single capstan drive permits linear, gentle deceleration of the tape after the end-of-character is written. The inter-character gap permits precise starting and stopping of tape during incremental reading or recording, at rates up to 75 characters per second.

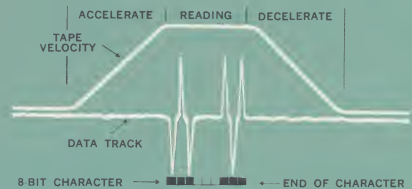


Figure 3 shows incremental reading of the recording of the 8 bit character diagrammed above. The top trace shows tape being accelerated and maintained at reading speed while the NRZI bits are read serially. The lower trace shows the signal read from the data track. Each pulse is a "1." Absence of pulse is a "0." Reading from left to right (tape motion), the code thus reads 11100011, the last pulse being the end of character mark.

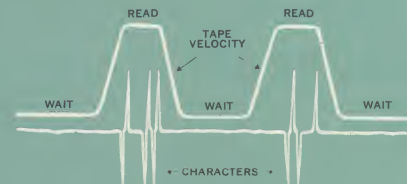


Figure 4 shows two successive characters being read incrementally when driving a slow speed output device. Because the 101 is faster, it reads a character then waits for the output device to ask for the next character.

A photograph of the Dartex-100 Tape Transport, a rectangular device with a dark front panel and a control panel on the right side. The brand name 'DARTEX' is visible on the top left of the front panel.

Dartex-100

A photograph of the Dartex-101 Incremental Digital Recorder, a larger rectangular device with a dark front panel and a control panel on the right side. The brand name 'DARTEX' is visible on the top left of the front panel.

Dartex-101

Basic System Components

Dartex-100 Tape Transport

Common to all DARTEX Digital Magnetic Tape Data Systems is the DARTEX-100 Tape Transport. Measuring 8½ by 11½ by 9¼ inches and weighing less than 25 pounds, it has a storage capacity of over two million bits of data on a three-inch reel of quarter-inch wide magnetic tape. An automatic loading feature provides for simple rapid exchange of tape reels. It records or reads out data at speeds compatible with electric typewriters, medium-speed computers, electronic desk calculators, and DATAPHONE equipment. Appropriate control and interface electronics can be provided for varied applications. A servo-driven single capstan follows input commands to provide fast start/stop bi-directional operation, incremental read/write and rewind. All operations are under precise capstan control that gently accelerates and decelerates tape to and from its running velocity. The conservative design of the DARTEX-100 utilizes inherent mechanical simplicity to achieve long trouble-free service.

Dartex-101 Incremental Digital Recorder

DARTEX Data Systems are based around the DARTEX-101 Incremental Digital Recorder. It is comprised of a DARTEX-100 tape transport and a microcircuit data controller which drives the transport in the incremental read/write mode. It also includes a power supply with extra capability to drive solenoids of many output devices. The standard DARTEX-101 can asynchronously record and reproduce eight-bit parallel characters at any rate up to 75 characters/second. This efficiently matches it to a wide variety of data source devices and data output and display devices, as well as the parallel eight-channel DATAPHONE that can be used on any voice-grade telephone line. Optionally, the DARTEX-101 may record or reproduce characters at synchronous rates up to 1200 characters/second, allowing it to be efficiently connected to the paper tape or communication input/output channels of most computers. Data capacity is sufficient to contain all the typewritten entries that can be made in one day.

Optional Features and Accessories

For the Dartex-100

- Power Supply.
- Read-only and Write-only modifications.
- Special Speeds and multispeed selections.
- Beginning-of-Tape and End-of-Tape photosense indicators.
- Higher speed synchronous operation with DARTEX-101 data format.
- Panel for Rack Mounting.

Custom options such as special interface levels are available.

For the Dartex-101

- Backspace and Forward Space. (Provides ability to backspace or space one character on command — as often as desired.)
- IBM Selectric Input/Output Typewriter Interface (Including solenoid drivers).
- DATAPHONE 402C Transmitting Interface with provisions for automatic answering.
- DATAPHONE 402D Receiving Interface.
- Beginning-of-Tape photosense with automatic forward to "load point" when loading tape and reverse to "load point" when rewinding tape.
- End-of-Tape photosense.
- Enclosure for desk top operation.
- Panel for rack mounting.

Equipment Specifications

Storage Media

Recording Format

Recording Density

Storage Capacity

Read/Write Speed

Data Rate

Start/Stop Time

Start/Stop Distance

Rewind

Electronics

Interface Levels

Data Inputs

Control Inputs

Data Outputs

Control Outputs

Size

Orientation

Weight

AC Power

DC Power

Dartex-100

¼" magnetic tape on 3" reels with computer grade hard binder oxide on 1.0 or 1.5 mil mylar, giving up to 350 feet of storage.

Saturation NRZI serial binary on one data track with a parallel parity track. Other formats optional.

556 bits/inch standard. Other densities optional.

Over 2.3 million data bits.

10 inches/sec bi-directional. Others to 40 inches/sec optional. Multi-speeds optional.

5,560 bits/sec standard. Up to 22,240 bits/second/track optional.

15 ms at 10 ips tape speed either direction — proportionately less at lower speeds.

75 mils at 10 ips tape speed — distance for lower tape speeds proportional to square of speed.

Precise capstan control at 40 ips takes less than two minutes to rewind 350 feet.

All silicon solid-state printed circuits with plug-in glass-epoxy cards.

0v and +6v nominal — "True" inputs are -6v to +0.5v; "False" inputs are +2v to +15v. Other levels optional.

2 channels, one for data, one for parity.

Run Forward Load Tape
Run Reverse Unload Tape
Fast Forward
Fast Reverse
Write Enable

2 binary pulsed channels (data and parity) which also provide "echo" check of write current while recording.

Transport Ready, End-of-tape (optional). Beginning-of-tape (optional).

8½" x 11½" top plate, 7½" behind mounting surface, 1¾" above mounting surface. Glass cover door included.

Horizontal or vertical.

Less than 25 pounds.

117v ±10%, 50/60 cps, 25 watts.

+12v ±10%, 1 amp aver.
-12v ±10%, 1 amp aver.
(±12v requires 4A peak, not simultaneous).

+6v ±1%, 0.1 amp.
-6v ±1%, 0.1 amp.

Dartex-101

¼" magnetic tape on 3" reels with computer grade hard binder oxide on 1.0 or 1.5 mil mylar, giving up to 350 feet of storage.

Saturation NRZI serial binary on one data track with a parallel parity track.

30 8-bit characters/inch using 556 bits/inch density.

Over 120,000 alpha-numeric characters.

3 inches/sec.

Asynchronous to 75 characters/sec. Higher synchronous rates to 1200 characters/second optional.

Characteristics same as Dartex-100. This prescribes start/stop performance for higher synchronous rates. (Optional)

Characteristics same as Dartex-100. This prescribes start/stop performance for higher synchronous rates. (Optional)

Precise capstan control at 40 ips takes less than two minutes to rewind 350 feet.

All silicon solid-state printed circuits with plug-in glass-epoxy cards — integrated microcircuit data controller.

0v and +6v nominal — "True" inputs are -6v to +0.5v; "False" inputs are +2v to +15v. Other levels optional.

8 channels with or without strobe. That is, the receipt of each incoming 8-bit character may be indicated either by the presence of a "true" level on one or more of the data lines or by a separate timing signal.

Read Character Load Tape
Record Character Unload Tape
Rewind
Backspace (optional)
Forward Space (optional)

8 channels with strobe signal.

Ready, End-of-tape (optional). Beginning-of-tape (optional).

9¼" x 17½" x 10¾" deep with optional enclosure (shown on front page). 8" x 16" x 9¼" without enclosure.

Horizontal or vertical.

Less than 40 pounds.

117v ±10%, 50/60 cps, 100 watts.

Self generated.

DARTEX

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